Adaptive Learning Using Artificial Intelligence in e-Learning: A Literature Review

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Abstract

The rapid evolution of e-learning platforms, propelled by advancements in artificial intelligence (AI) and machine learning (ML), presents a transformative potential in education. This dynamic landscape necessitates an exploration of AI/ML integration in adaptive learning systems to enhance educational outcomes. This study aims to map the current utilization of AI/ML in e-learning for adaptive learning, elucidating the benefits and challenges of such integration and assessing its impact on student engagement, retention, and performance. A comprehensive literature review was conducted, focusing on articles published from 2010 onwards, to document the integration of AI/ML in e-learning. The review analyzed 63 articles, employing a systematic approach to evaluate the deployment of adaptive learning algorithms and their educational implications. Findings reveal that AI/ML algorithms are instrumental in personalizing learning experiences. These technologies have been shown to optimize learning paths, enhance engagement, and improve academic performance, with some studies reporting increased test scores. The integration of AI/ML in e-learning platforms significantly contributes to the personalization and effectiveness of the educational process. Despite challenges like data privacy and the complexity of AI/ML systems, the results underscore the potential of adaptive learning to revolutionize education by catering to individual learner needs.